

Comparison of Alcohol- and Chlorhexidine-Based Antisepsis for Surgical Site Preparation in Equine Arthroscopy: A Prospective Clinical Trial

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Faculty of Veterinary Medicine
Summary of Dissertation

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This thesis evaluated chlorhexidine gluconate (CHG)-based and isopropyl alcohol (IPA)-based surgical skin antisepsis protocols in horses undergoing elective tarsocrural arthroscopy. A prospective randomized clinical trial was performed using 62 client-owned horses (88 operated joints). Horses were assigned to either a CHG-based or IPA-based preparation protocol. Swab samples were collected before skin preparation, immediately after antisepsis, and at the end of surgery following skin closure to assess immediate and sustained bacterial reduction. Antiseptic preparation time, portal type, skin reactions, and perioperative complications were also recorded.

Bacterial reduction data were analyzed using multivariable linear mixed models, with horse and limb included as random effects to account for repeated measurements and bilateral procedures. Both protocols achieved immediate and sustained bacterial reductions exceeding 2.5 log₁₀ (>99.7%). Immediate bacterial reduction was significantly greater in the CHG group compared with the IPA group (2.80 vs 2.55 log₁₀; P < 0.001). Sustained bacterial reduction was also greater with CHG during short-duration procedures (<30 minutes; P=0.009), although no significant differences were identified during medium- or long-duration procedures. Antiseptic preparation time was significantly shorter in the IPA group (P < 0.001). One horse in the IPA group developed postoperative septic arthritis, which was within expected complication rates for elective equine arthroscopy.

Overall, both CHG- and IPA-based antiseptic protocols provided effective surgical skin antisepsis for equine arthroscopy. The findings support WA-based antisepsis as an effective and clinically acceptable alternative to CHG-based protocols while potentially reducing preparation time and reliance on chlorhexidine in the setting of increasing concerns regarding antimicrobial resistance.

Publications:

Nakamae Y, Elce YA, Saab ME, McClure JT, Doyle AJ. Comparison of Alcohol- and Chlorhexidine-Based Antisepsis for Surgical Site Preparation in Equine Arthroscopy: A Prospective Clinical Trial. *Veterinary Surgery*, Submitted.

Nakamae Y, Elce YA, Saab ME, McClure JT, Doyle AJ. Alcohol-based antisepsis without the use of chlorhexidine for arthroscopy in horses. *Journal of Equine Veterinary Science* 2025;145:105257.

Nakamae Y, Ziegler J, Hobbs K, Rivero L, Kennedy S, Workman J, Gomez D. Gastrointestinal Foreign Bodies in Pet Pigs: 17 cases. *The Journal of Veterinary Internal Medicine* 2022;36:1185–1189.

Nakamae Y, Ishihara A, Sasaki N, Ito M, Yanagawa M, Yamada K. Displacement of large colon in a horse with enterolithiasis due to changed position observed by computed tomography. *Journal of Equine Science* 2018;29(1):9-13

Presentations

Nakamae Y, Elce YA, Saab ME, McClure JT, Doyle AJ. Prospective Clinical Trial of Comparison between Alcohol-Based and Chlorhexidine-Based Antisepsis. Podium Presentation, Annual Symposium of Japanese Society of Equine Science. December 1, 2025.

Nakamae Y, Elce YA, Saab ME, McClure JT, Doyle AJ. Alcohol Antisepsis in Equine Arthroscopy. Podium Presentation, American College of Veterinary Surgeons Surgery Summit, October 23, 2025.

Biographical Data

Born in Nagoya, Japan.

Awards

ACVS Foundation Resident Education Travel Grant-2025

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